

Chapter 1 BACKGROUND

1.1 INTRODUCTION

A fire occurred on the night of Feb. 20, 2003, in The Station nightclub at 211 Cowesett Avenue, West Warwick, Rhode Island. A band that was performing that night, during its performance, used pyrotechnics that ignited foam insulation lining the walls and ceiling of the platform being used as a stage. The fire spread quickly along the ceiling area over the dance floor. Smoke was visible in the exit doorways in a little more than one minute, and flames were observed breaking through a portion of the roof in less than five minutes. Egress from the nightclub was hampered by crowding at the main entrance to the building. One hundred people lost their lives in the fire.

The National Institute of Standards and Technology (NIST), under the authority of the National Construction Safety Team (NCST) Act [1], established a National Construction Safety Team (Team) on Feb. 27, 2003, to determine the likely technical causes of the building failure that led to the high number of casualties in that fire. The investigation included the following tasks:

- identification of technical issues and major hypotheses requiring investigation through consultations with experts in fire protection engineering, and emergency evacuation, and members of other teams investigating The Station fire;
- data collection from local authorities, contractors and suppliers, building and fire protection design documents, records, plans, specifications, video and photographic data, telephone and radio transmissions, field data, and a limited number of interviews and other oral and written accounts from building occupants and emergency responders, and other witnesses as reported by the news media;
- analysis and comparison of building and fire codes and practices, and review and analysis of practices used in operation of the building;
- simulation and analysis of phenomena (with associated uncertainties), including fire spread, smoke movement, tenability, occupant behavior and response, evacuation issues, and operation of active and passive fire protection systems; and
- testing to provide additional data and support simulation predictions.

This document constitutes the draft report of the NIST investigation into The Station fire. The building and surroundings as they were prior to the fire are described in the following section of this chapter. The general history of the building is reviewed here as well. Chapter 2 provides a timeline of the incident, including the ignition and spread of the fire, the evacuation process, and firefighting activities. The fire and emergency response and procedures are detailed in Chapter 3. Chapter 4 describes the testing and supporting experiments, and Chapter 5 provides background and results of the computer simulation of the fire and smoke movement. An analysis of the evacuation process is provided in Chapter 6. Chapter 7 reviews the model building and fire codes that are relevant to a structure like The Station. The report concludes with a summary of findings and recommendations in Chapter 8. There are a number of appendices that provide more detail, or information that is peripheral to the main objectives. NIST video recordings and animations are included in the CD that accompanies this report.

1.2 DESCRIPTION OF THE BUILDING AND SITE

The Station nightclub was located at 211 Cowesett Avenue, West Warwick, Rhode Island. It was a single-story wood frame building with a footprint of about 412 m² (4484 ft²) and a small basement under the main bar room. Figure 1-1 is a photograph of the building on its lot. The north-facing front door of the nightclub was set back about 42 m (140 ft) from Cowesett Avenue, a three-lane, two way street that runs east-to-west. Kulas Road is two lanes wide and runs along the east side of the building, about 10 m (33 ft) east of the side bar exit. There was no direct street access to the building from either the west or south sides. Parking for over 100 cars was provided in the front and to the west side of the building.

A distant aerial view of the area, Figure 1-2, shows the nightclub in relation to the community. Note the location of Fire Station #4 across Cowesett Avenue about 500 m (1650 ft) to the west of The Station.

Figure 1-3 is a sketch showing the north side of the building approximately as it looked on February 20, 2003. Note the windows on the left which are in the main bar area, the windows on the right in the sunroom/poolroom, the ramp and stairs leading from the main entrance in front, and the stairways leading from side exits on the west and east of the building. Inside the double doors of the main entrance is a vestibule with a single doorway. Figures 1-4a and 1-4b are photographs of the north side and north west corner of the building as they looked within a year or two of the February 20, 2003 fire. The external walls were primarily covered with painted wood shingles or panels above a concrete foundation. The roof was flat with a wood shingle façade along the front and sides, as seen in the photographs.

Figure 1-5 shows a plan view of the nightclub floor, a composite from multiple sources of information obtained during the investigation. Entering from the front through the double doors would have brought one into a short entrance hall with a single door at the far end that led to the ticket-taker area. To the right of the ticket taker was an assembly area containing the dance floor, sunroom (or poolroom), elevated dining area, and a platform (imprecisely referred to as a stage) with the drummer's alcove. A dressing room was situated in the northwest corner and an exit to the outside was located between the platform and dressing room. Except for the front of the sunroom, which was composed of darkened glass windows, there were no other windows in the right half of the nightclub.

Turning left at the ticket-taker area would have brought one into the main (or horseshoe) bar room. An exit to the outside was located on the far left wall. There were no windows on that wall but windows lined most of the front of the main bar room.

The kitchen separated the main bar room from a smaller assembly area (or dart room) and back bar. There was one door to the outside from within the kitchen. A storage area, office, and restrooms were located in the back of the nightclub. There were no additional exits leading directly to the outside from these rooms; any windows or exits that had been installed were covered with bars or paneling.

Figures 1-6a and 1-6b show different views inside the nightclub, highlighting the exit doors next to the platform and the exit from the main bar area.

1.3 HISTORY OF THE BUILDING¹

The Station nightclub was a single-story wood frame building, with a small basement. Over the years the building was sold multiple times and changed function, as shown in Table 1-1.

¹ This section is taken from the contract report prepared by Koffel Associates, Inc. [11]

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Figure 1-1. General orientation of building and site [2]



Figure 1-2. Aerial photograph of the community around The Station nightclub [2]

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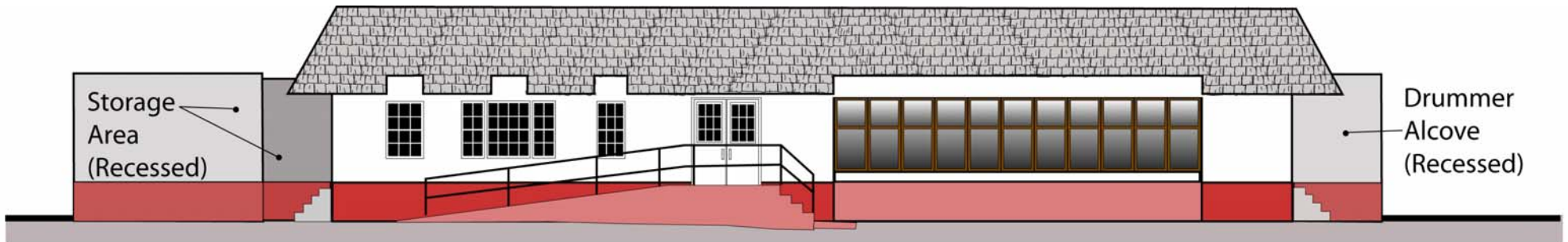


Figure 1-3. Sketch of the north side of The Station nightclub locating the main entrance, front stairway/ramp, windows in the main bar area (left), sunroom/pool room (right), and exit stairs from the east and west sides



courtesy of Anthony Baldino III

Figure 1-4a. Front view of The Station nightclub showing the main entrance [3]



courtesy of Anthony Baldino III

Figure 1-4b. View of the northwest corner showing the sunroom windows [3]

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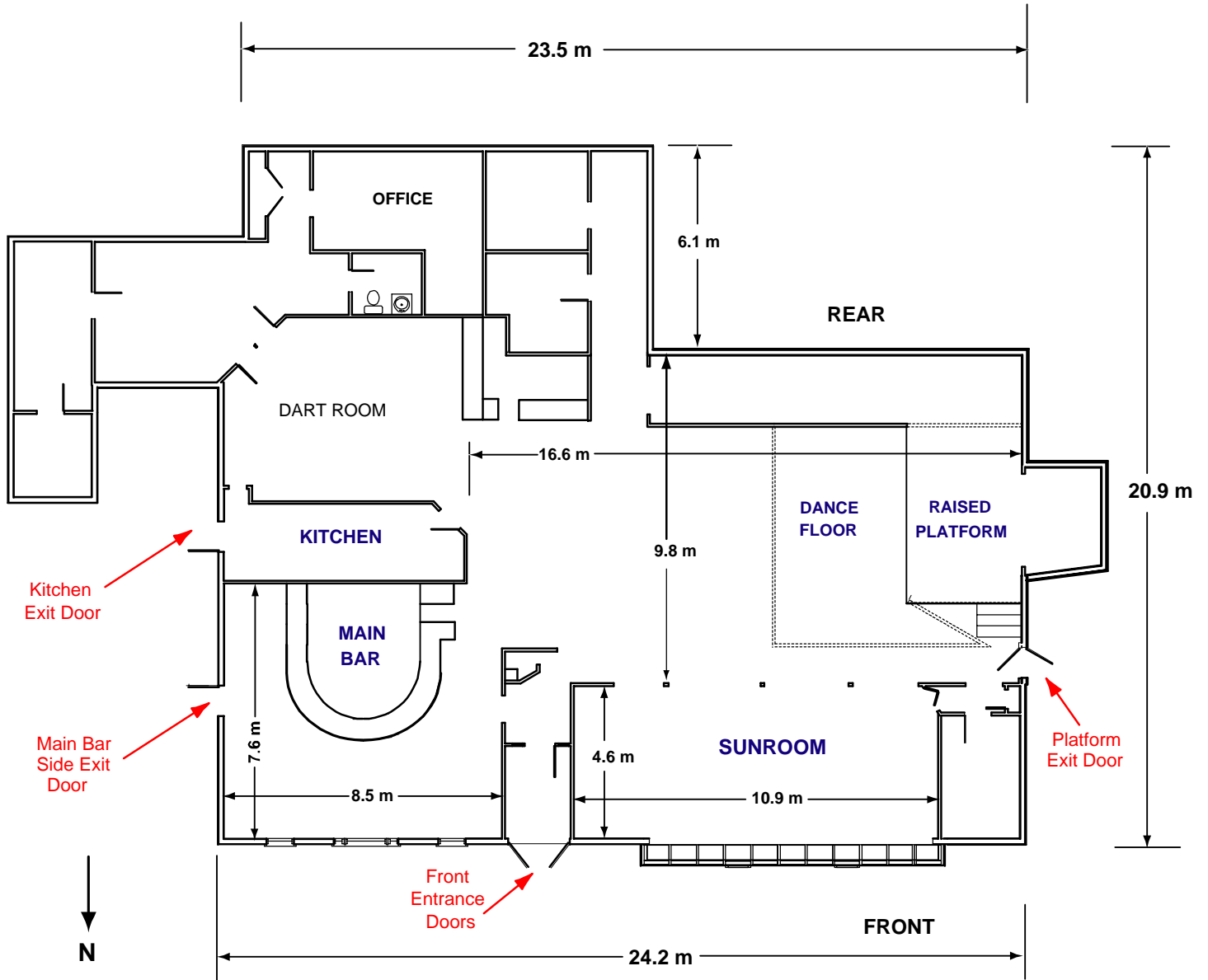


Figure 1-5. Plan view of The Station showing different rooms and exits.

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Figure 1-6a. View of inside of nightclub showing exit sign above door near platform [4]



Figure 1-6b. View of inside of nightclub showing exit sign above door in main bar area [4]

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On the night of the fire, The Station nightclub looked different from when it was built in 1946 [5]. While the club was still a single-story wood building with a small basement, it was modified numerous times over its 57 years [6, 7]. Although the original plans of the building were not located, several sources reported that the building was modified over the years. The modifications included small additions, multiple reconfigurations of the interior, rebuilding after a fire, and rebuilding after a car rammed the front of the building [5].

The original date of construction has been variously reported to be 1946 or 1950. The 1946 date is based on a *Providence Journal* article dated July 13, 2003 [5]. The article reports the land was purchased in 1945; the nightclub (originally named Casey's Inn) was constructed in 1946 and changed hands in 1947. The Town of West Warwick tax records, dated May 30, 2001, indicate that the building was constructed in 1950 [8]. West Warwick land records indicate the property changed hands in November 1945 and 1947, suggesting the construction took place in 1946 as reported by the *Providence Journal* (W. Warwick Land Use Record undated, [5,9]). For the purposes of this report, the date of construction will be 1946.

In an effort to document the original building construction date, construction permits were reviewed at the Town of West Warwick for 211 Cowesett Avenue. The permits document dates of construction and provide brief narratives of work to be completed. However, the details of the construction are not included in the permits. It is not possible to determine from the permits the extent of work completed, or if the work was completed in compliance with model codes of the time.

The building was damaged by fire in March 1972. The July 2003 *Providence Journal* article reported the firefighters cut holes in the roof [5]. The contents of the building sustained fire and smoke damage, but the building structure remained. The first building permit issued after the fire was in November 1974. The permit makes no mention of roof fire damage repair. It simply states that the work included interior paneling and partitions. Workmen reported that smoke-stained and charred structural framing remained in the building continuously up until the February 2003 fire.

In June 2001, a car ran through the front of the building. A building permit was issued on June 19, 2001 to repair the damage [10]. The extent of the damage is not detailed; however, the permit indicates that a window and a portion of the exterior wall adjacent to the window were replaced.

The Town of West Warwick tax records indicate the building consisted of a small basement, 165 m² (1794 ft²) in area, and a main level of 412 m² (4484 ft²) [5]. The tax record depicts the general outline of the building with dimensions, not including windows or doors.

1.4 PREVIOUS INCIDENTS AT THE STATION²

At the time of the 1972 fire mentioned above, the building housed a nightclub named Julio's [5]. The ensuing fire alarm alerted responders; firefighters arrived to find the building engulfed in flames. They contained the fire, but much of the interior of the club had been significantly damaged. Investigators determined that the fire started in the rear center of the building and worked up through the ceiling and into the attic. No occupants were in the club at the time of the fire.

No other significant fire incidents or egress difficulties were reported to have occurred in this building prior to February 20, 2003.

² This section taken from the contract report prepared by Ove Arup & Partners Massachusetts [12].

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Table 1-1. Time Line of Construction and Changes of Use		
Date	Modification	Extent of Construction
Spring 1946	Original construction as a night club	New construction
June 1964	Change of ownership Converted to meeting house (same Use Group as restaurant)	Unknown if any
May 1967	Change of ownership and name Converted to night club	See permit July 27, 1967
July 27, 1967 (building permit 6748)		Commercial alterations Paneling inside Rebuild two porches in front New sign outside
1968	Name change	Unknown
June 1969	Nightclub closed	
April 1970	Change of ownership and name	See permit May 18, 1970 Converted to restaurant and removed the bar
May 18, 1970 (building permit 8018)		Alterations to Business Roofing, paneling etc.
Fall 1970	Renamed	Unspecified remodeling
June 1971	Bank forecloses Reopens as night club	
October 18, 1971	Alterations and remodeling	
March 1972	Fire Club may have remained closed until 1974	
June 1974	Change of ownership	
November 15, 1974	Convert to restaurant	Commercial alterations Interior paneling and partitions
April 29, 1975 (building permit 10558)	Commercial exterior alterations and renovations	
July 1, 1975 (building permit 10641)	Addition	Addition 30.6 m ² (330 ft ²)
February 1985	Change of ownership Change of name Converted to “pub”	
February 20, 1985 (building permit 14930)		Remodeling and renovations to existing restaurant
Late 1980's	Pub closed	
1991	Reopened as nightclub	
January 1993	Change of ownership renamed	
January 1995	Change of ownership	
December 1999	Non-permitted work	
March 2000	Change of ownership renamed	
June 19, 2001 (building permit B01-1098)	Repair damage from car ramming building	Remove damaged window and replace size for size, replace damaged sill plate and reframe damaged exterior wall and interior wall and exterior siding

1.5 JURISPRUDENCE

Subsequent to the events of February 20, 2003, a large number of public and private legal actions have begun. While they are outside the scope of this investigation, NIST notes that a Grand Jury has returned indictments and a trial is pending; private suits have been filed seeking damages; disputes have arisen involving Workers Compensation; and OSHA has issued a citation which is presently being contested. NIST expresses no views on the merits of any of these proceedings.

In addition, these ongoing legal actions limited NIST's access to some physical evidence and the ability to interview some witnesses.

1.6 REFERENCES FOR CHAPTER 1

- [1] National Construction Safety Team Act, Public Law 107-231 -- Oct. 1, 2002, Congress of the United States of America.
- [2] purchased from GlobeXplorer 2004
- [3] photograph by Anthony Baldino III (undated)
- [4] Butler, Brian, Video by WPRI, Channel 12, February 20, 2003.
- [5] *Providence Journal*, Zachary R. Mider July 13, 2003.
- [6] West Warwick Application for Building Permit Number 6748. July 27, 1967.
- [7] West Warwick Application for Building Permit Number 8018. May 18, 1970.
- [8] West Warwick, Rhode Island Commercial /Industrial Property Record Card May 30, 2001
- [9] West Warwick, Rhode Island Land Use Record. Undated.
- [10] W. Warwick Application for Building Permit Number B01-1098, June 19, 2001.
- [11] "Code Analysis of the Station Nightclub Warwick Rhode Island," Koffel Associates, Inc., Ellicott City, MD, NIST contract report # KA 03732-004, June 23, 2004.
- [12] "Evaluation of Limitations to Egress through Doorways in Emergency Situations," Ove Arup & Partners Massachusetts Inc., NIST contract report #32979, February 18, 2004.